TATA STEEL
#WeAlsoMakeTomorrow

TATA SHAKTEE
LIVE WITH PRIDE

TATA STEEL LIMITED

Tata Centre 43 Jawaharlal Nehru Road Kolkata 700 071
Tel 91 33 2288 7051/ 1951 / 3061 Fax 91 33 2288 5926
Toll-free No: 1800 108 8282 I For online sales: aashiyana.tatasteel.com
Website: www.tatashaktee.com

TATA STEEL
#WeAlsoMakeTomorrow

TATA SHAKTEE
LIVE WITH PRIDE

TATA SHAKTEE PRODUCT BROCHURE

LETTER FROM COMS' DESK

Dear Friends,

Launched in the year 2000, Tata Shaktee was the first brand in an erstwhile commoditised category. Since its launch, Tata Shaktee has been the leader in GC [Galvanised Corrugated] sheets. The reason for its dominance is a continued focus on quality, backed by superior service, an ever expanding distribution network and initiatives to connect with customers.

Tata Shaktee provides the best value for money as compared to other roofing alternatives. It is available at the same Recommended Consumer Price [RCP] across a particular geography which ensures that there is transparency in pricing. Made from superior quality steel in the World's Best Steel Plant [as certified by World Steel Dynamics], Tata Shaktee GC sheets don't break easily. It offers the exact promised dimensions and the sheet has a guaranteed minimum zinc coating of 120 GSM or more which protects the sheet against corrosion.

This manual lays down the numerous advantages of Tata Shaktee over ordinary GC sheets. It also provides guidelines regarding the installation of sheets for roofing purpose. Tips for maintenance have also been incorporated to ensure that one gets the most out of this product. International standard best practices have been combined with knowledge gained from local fabricators to ensure that the recommendations in this manual have a basis in both theory and practice.

We request you to familiarise yourself with the contents of this manual so that you can extract the best possible performance from Tata Shaktee. Should you have any feedback that you wish to share, call on our toll free number: 1800-108-8282

Live with pride, forever.

Sanjay S. Sahni
Chief of Marketing & Sales
Branded Products & Retail

CONTENTS

JOURNEY OF TATA SHAKTEE

2018 — Launch of Tata Kosh

2017
- 3 MT sales achieved
- Launch of Tata Steel Aashiyana: One-stop shop for all Tata Steel B2C Brands
- Launch of Tata Shaktee Gutter
- Consumer Superbrand Award

2016
- Collaboration with Rallis India Ltd. under GRAM initiative to collectively serve the rural consumers
- Consumer Superbrand Award

2015
- Tata Shaktee completed 15 years,
- Launch of 'Ek Kadam Parivartan Ki Ore'
- Tata Shaktee Rural Market Activation campaign to drive Category Conversion

2014 — Launch of Branded Accessories: Ridges

2013
- Recieved Flame Awards from Rural Marketing Association of India
- 'Jeeto Shaan Se Jiyo Garv Se'- First Pan India Consumer Scheme launched

2012
- 2 MT sales milestone achieved
- Brand position shifted to 'Garv Se Jiyo'
- Superbrand status achieved
- Wow Awards received

2011
- Launch of Roof Junction
- Commercial initiation of Nest-In

2010 — 'Dus Saal Bemisaal'- Tata Shaktee completed 10 years

2009
- Durashine formally launched in the Tata Shaktee Channel
- All India Star Club Member meet in Hyderabad & Goa

2008 — Concept of RWH started in Nagpur

2007
- Tata Shaktee Market share reaches 30%
- 1 MT Sales mark achieved
- Formation of Star Club - dealer loyalty plan

2006
- Replenishment offer rolled out through E- Connect
- Learn & Lead programme was launched

2005
- RIP stores were launched
- Brand position shifted to "Lasts Longest"
- Haat Hungama Campaign was launched

2004
- Tata Shaktee became India's No 1 brand in steel roofing
- Recommended Consumer Price (RCP) launched
- Haat Campaigns started

2003
- Launch of the Retail Value Management (RVM)
- Tata Shaktee Wider GC sheets launched
- Tata Shaktee Parivaar initiated

2002
- Press ads launched
- Launch of dealer sales promotion scheme, 'Khul Gayee Kismat'
- Authorized retailers appointed
- Professional Distribution System was created

2001
- 'Naye Yug Ki Nayee Shaktee'- First Campaign was launched
- Printing of Zinc thickness on sheets

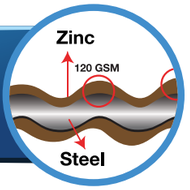
2000
- Birth of Tata Shaktee
- Outbound Logistics Study was done
- CRM Mill commences production

ADVANTAGES OF TATA SHAKTEE GC SHEET

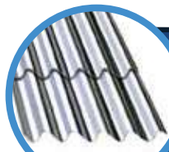
- Complete Roofing Solutions (Branded accessories)
- Assured Thickness

- Accurate Dimension

- Uniform Zinc Coating



- Perfect Overlapping



- Available in wide range of SKUs

- ISI Certified
- Fixed and Transparent pricing

- Superior Strength (700 MPa)
- Superior distribution Network

- Superior Packaging

THE SHAKTEE EDGE

TATA SHAKTEE GC SHEET

ORDINARY GC SHEET

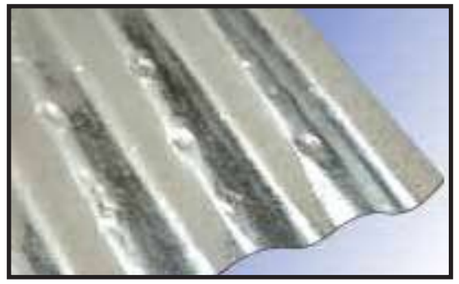
1 Right hardness for roofing

Accurate tempering in TATA Shaktee GC sheets resist cracks and fissures during drilling.

Uneven tempering causes ordinary sheets to crack during drilling.

2 High tensile strength

High tensile strength (700 MPa) of TATA Shaktee GC sheets resist natural forces like hailstorms and other external forces.



Low tensile strength of ordinary sheets results in damage/ rupture caused by hailstorms and other external forces.

3 Uniform zinc coating

Uniform 120 GSM Zinc coating ensured by the sophisticated feed forward X-Ray coating gauge results in even surface protection.

Non-uniform Zinc coating cause parts of galvanised surface with low Zinc coating to corrode faster. This reduces the sheet life drastically.

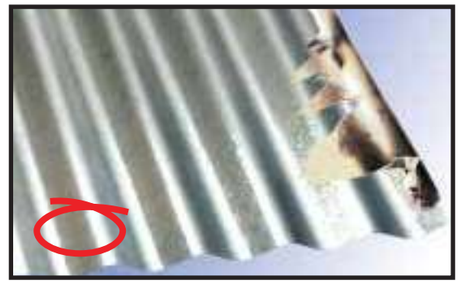
THE SHAKTEE EDGE

TATA SHAKTEE GC SHEET

ORDINARY GC SHEET

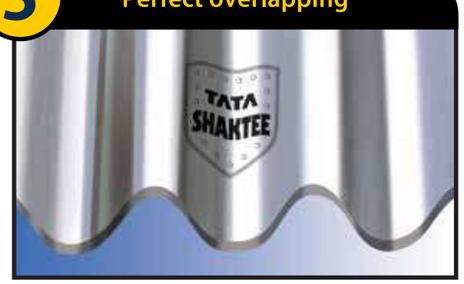
4 Excellent zinc adherence

Superior technology and process control ensures proper surface cleaning before coating. This means a cleaner steel surface that results in excellent zinc adherence.



Inferior technology and process control results in unclean steel surface leading to low adherence of zinc coating. This causes the galvanised surface to peel off resulting in reduced sheet life.

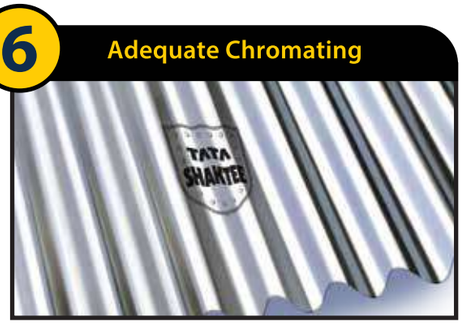
5 Perfect overlapping



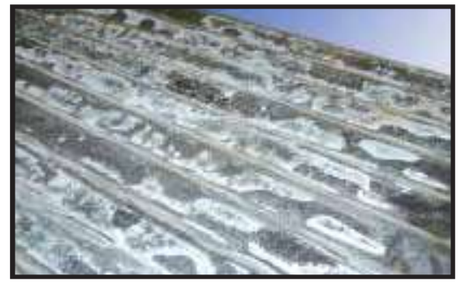
Even corrugations ensure perfect overlapping which results in improved weather-proofing. Moreover, there is no unwanted retention of particles and moisture between the overlapped joints. This prevents corrosion originating from overlappings.

Uneven corrugations and edge waviness lead to gaps in overlapping, resulting in a badly fabricated roof. Unwanted particles and moisture stuck between the sheet overlappings results in corrosion starting from the joint.

6 Adequate Chromating



Usage of the best and adequate chromate solution at the galvanising stage prevents formation of white rust on the sheets. As a result, sheet life is enhanced.

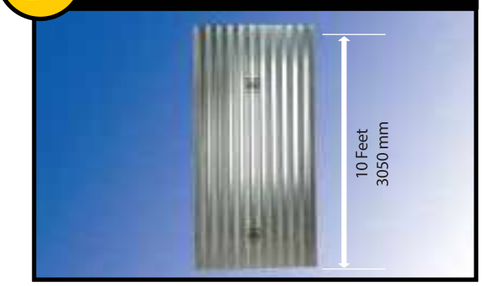


In case of ordinary GC sheets, inadequate chromating on the galvanised surface results in formation of white rust on the sheets that reduces sheet life.

THE SHAKTEE EDGE

TATA SHAKTEE GC SHEET

7 Accurate Dimension

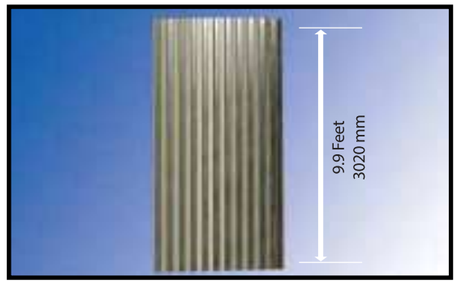


The length of the sheet is equal to the standard specified length, giving you the true value for your money.

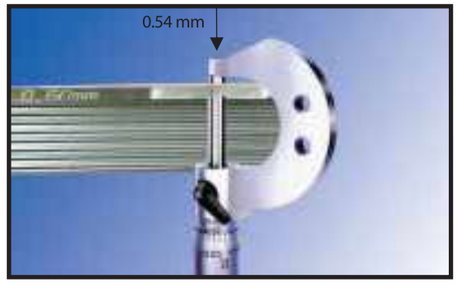
8 Assured Thickness

TATA Shaktee GC sheets come with assured thickness. The tolerance maintained is more stringent than the standards defined by Bureau of Indian Standards (BIS).

ORDINARY GC SHEET



Ordinary sheets, quite often, are of lower length than the standard length specified. As a result you get lesser value for your money.

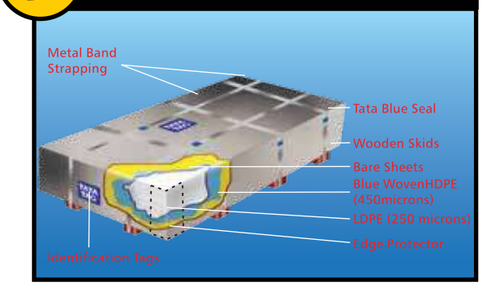


In ordinary GC sheets, the thickness is not printed and even if it is, the actual thickness may or may not match the actual thickness.

THE SHAKTEE EDGE

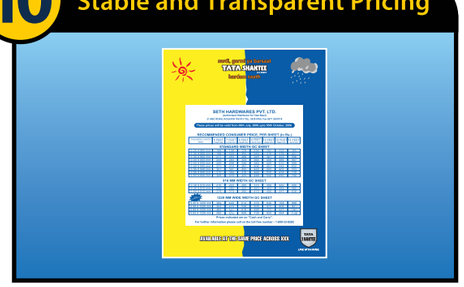
TATA SHAKTEE GC SHEET

9 Superior Packaging



TATA Shaktee GC sheets are packaged with Blue Woven HDPE (450 microns) and LDPE (250 microns) plastics along with edge protectors, tamper proof seals and metal jackets on the top that protects sheet quality, especially during transit.

10 Stable and Transparent Pricing

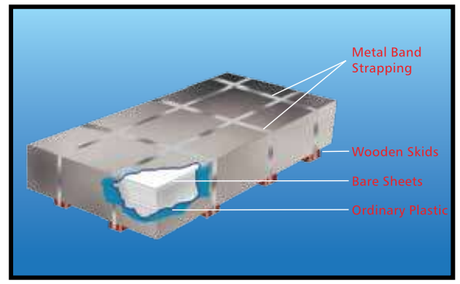


The Recommended Consumer Price of TATA Shaktee GC Sheets ensures the required transparency and stability in prices across the states.

11 Superior Distribution Network

A superior distribution network comprising 35 distributors and more than 4500 dealers spread across the country ensures excellent reach and regular supply of TATA Shaktee GC Sheets, as and when required.

ORDINARY GC SHEET



Ordinary sheets are packaged with poor quality plastics with a metal jacket on top that is susceptible to damage during transit.

Pricing of ordinary GC sheets is opportunistic and unfair, which means that prices are unstable and non-transparent, thereby subject to change even on a weekly basis.

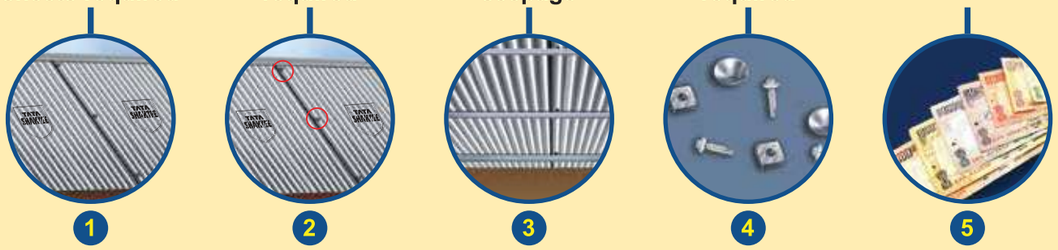
Nonexistence of authorised dealer network leads to irregular supply and even sales of substandard products.

NEW RANGE

1220 mm (width)

WIDER CHOICE. GREATER PRIDE.

FIVE ADVANTAGES



LONGER LENGTH, GREATER PRIDE

TATA SHAKTEE RANGE

ADVANTAGES OF TATA SHAKTEE WIDER (1220 MM) GC SHEET

Lesser number of sheets required:
You will require lesser number of TATA Shaktee Wider GC Sheets as compared to other narrow widths of GC sheets available in the market in order to cover a given roof size.

Fewer joints required:
Lesser number of roofing sheets mean fewer overlaps which reduces wastage of steel at side overlappings. Less number of overlappings ensure substantial cost savings.

Fewer seepage points:
Lesser number of joints mean fewer holes need to be drilled to fix TATA Shaktee Wider GC Sheets, resulting in lower number of seepage points on the roof and enhanced sheet life.

Fewer accessories required:
Fewer holes in fixing TATA Shaktee Wider GC Sheets reduce requirement of fasteners and substantially resulting in cost savings.

Greater savings:
All the above benefits result in unlimited monetary savings.

SAVINGS FROM TATA SHAKTEE WIDER (1220 MM) GC SHEET

LENGTH OF ROOF		NO. OF SHEET REQD. FROM 840MM WIDE GC	NO. OF SHEET REQD. FROM 1220MM WIDE GC	NO. OF OVERLAPPING SAVED
(mm)	(feet)			
915	3	2	1	1
1525	5	3	2	1
3050	10	5	3	2
4575	15	7	5	2
6100	20	9	6	3
7625	25	11	7	4
9150	30	13	9	4
10675	35	15	10	5
12200	40	17	11	6
13725	45	19	13	6
15250	50	21	14	7
18300	60	26	17	9
21350	70	30	20	10
24400	80	34	22	12
27450	90	38	25	13
30500	100	42	28	14

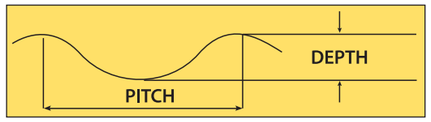
THE SHAKTEE SKUs

WIDE RANGE OF SKUs

TATA Shaktee SKU List		Length							
Thickness (mm)	Width (mm)	1830 mm 6ft	2135 mm 7ft	2440 mm 8ft	2740 mm 9ft	3050 mm 10ft	3660 mm 12ft	4270 mm 14ft	4880 mm 16ft
0.20, 0.22	740	✓	✓	✓	✓	✓	✓	✓	
	780	✓	✓	✓	✓	✓	✓	✓	
	800	✓	✓	✓	✓	✓	✓	✓	
0.25, 0.28	800	✓	✓	✓	✓	✓	✓	✓	✓
	910	✓	✓	✓	✓	✓	✓	✓	✓
	1220	✓	✓	✓	✓	✓	✓	✓	✓
0.30, 0.35, 0.40	800	✓	✓	✓	✓	✓	✓	✓	✓
	910	✓	✓	✓	✓	✓	✓	✓	✓
	1220	✓	✓	✓	✓	✓	✓	✓	✓
0.45, 0.50, 0.60, 0.63, 0.70	800	✓	✓	✓	✓	✓	✓	✓	✓
	840	✓	✓	✓	✓	✓	✓	✓	✓
	910	✓	✓	✓	✓	✓	✓	✓	✓
	1220	✓	✓	✓	✓	✓	✓	✓	✓
0.80	840	✓	✓	✓	✓	✓	✓	✓	✓
	910	✓	✓	✓	✓	✓	✓	✓	✓
	1220	✓	✓	✓	✓	✓	✓	✓	✓

TATA SHAKTEE SPECIFICATIONS

DEPTH AND PITCH OF CORRUGATION



WIDTH OF GC SHEET AFTER CORRUGATION (mm)	DEPTH OF CORRUGATION (mm)	PITCH OF CORRUGATION (mm)	NO. OF CORRUGATIONS
800	17.5	75	10 + ½ + ½
840	12.5	78	10 + ½ + ½
910	17.5	75	11 +½ + ½
1220	17.5	75	15 + ½ + ½

TOLERANCE LEVELS

PARAMETERS		BIS	TATA SHAKTEE
LENGTH		+15 mm, - 0	- 0/+2.0 mm
WIDTH	Before corrugation	+10 mm, - 0 mm	+ 3 mm, -0 mm
	After corrugation	+ 25 mm	+ 5 mm
THICKNESS		+/- 0.05 mm	+/- 0.02 mm
DIAGONAL DIFFERENCE		Should not differ more than 20 mm	Should not differ more than 20 mm
DEPTH OF CORRUGATION		+ 2.5 mm	+ 2.5 mm
PITCH OF CORRUGATION		5 mm	5 mm

Note : Tata shaktee tolerance levels are more stringent as compared to BIS specifications owing to superior process control.

TATA SHAKTEE WEIGHT CHART

COATING

TYPE OF COATING	Galvanised (Zinc) Spangled
COATING WEIGHT	120 GSM (gram per square metre), Class 8 (as per BIS) (For tailor made products Zinc coating, may vary between 60-600 GSM)

Approximate weight per sheet (for 120 GSM coating)

APPROXIMATE WEIGHT PER SHEET (for 120 GSM coating)								
SIZE (THICKNESS X WIDTH)	APPROXIMATE WEIGHT PER PIECE FOR VARIOUS LENGTHS OF SHEET (in Kg)							
(mm)	6ft (1830 mm)	7ft (2135 mm)	8ft (2440 mm)	9ft (2740 mm)	10ft (3050 mm)	12ft (3660 mm)	14ft (4270 mm)	16ft (4880 mm)
0.20 x 800/840	2.44	2.86	3.27	3.67	4.08	4.90	5.74	6.53
0.22 x 800/840	2.72	3.20	3.60	4.05	4.51	5.46	6.34	7.34
0.25 x 800/840	3.12	3.63	4.14	4.62	5.15	6.25	7.23	8.05
0.28 x 800/840	3.49	4.06	4.63	5.10	5.82	6.89	8.21	9.17
0.30 x 800/840	3.68	4.30	4.91	5.51	6.14	7.35	8.57	9.83
0.35 x 800/840	4.32	5.06	5.79	6.49	7.23	8.65	10.10	11.54
0.40 x 800/840	4.99	5.82	6.63	7.47	8.28	9.93	11.61	13.27
0.45 x 800/840	5.62	6.58	7.49	8.41	9.37	11.24	13.11	14.89
0.50 x 800/840	6.31	7.34	8.39	9.43	10.46	12.59	14.63	16.76
0.55 x 800/840	6.86	8.01	9.15	10.29	11.45	13.72	16.03	18.03
0.60 x 800/840	7.55	8.82	10.05	11.33	12.59	15.12	17.62	20.11
0.63 x 800/840	7.93	9.31	10.58	11.89	13.25	15.84	21.11	21.19
0.80 x 800/840	10.12	11.81	13.47	15.18	16.89	20.19	23.62	26.99
0.25 x 910	3.46	4.10	4.65	5.27	5.80	6.95	8.13	9.17
0.28 x 910	3.92	4.54	5.19	5.88	6.48	7.84	9.08	10.38
0.30 x 910	4.16	4.84	5.53	6.22	6.90	8.25	9.67	11.03
0.35 x 910	4.88	5.70	6.52	7.35	8.13	9.75	11.35	13.04
0.40 x 910	5.61	6.58	7.48	8.38	9.33	11.20	13.07	14.94
0.45 x 910	6.35	7.37	8.45	9.50	10.54	12.62	14.74	16.90
0.50 x 910	7.13	8.28	9.45	10.65	11.78	14.16	16.52	18.93
0.60 x 910	8.50	9.92	11.36	12.75	14.16	17.03	19.89	22.72
0.63 x 910	8.95	10.44	11.94	13.43	14.94	17.89	20.81	24.00
0.80 x 910	11.42	13.32	15.34	17.12	19.07	22.92	26.70	30.59
0.30 x 1220	5.65	6.61	7.46	8.38	9.34	11.23	13.11	14.97
0.35 x 1220	6.54	7.56	8.73	9.84	10.88	13.10	15.26	17.52
0.40 x 1220	7.51	9.15	10.02	11.21	12.51	15.02	17.53	19.99
0.45 x 1220	8.48	9.88	11.30	12.70	14.13	16.95	19.77	22.62
0.50 x 1220	9.49	11.10	12.60	14.14	15.74	18.90	22.06	25.23
0.60 x 1220	11.32	13.16	15.19	17.03	18.96	22.75	26.52	30.40
0.63 x 1220	11.89	13.92	15.88	17.79	19.95	23.91	27.88	31.90
0.80 x 1220	15.26	17.38	20.43	22.77	25.55	30.57	35.60	40.69

Note:
1) BIS tolerance for the 'Bundle Weight' (70/72 running feet of sheets) is 5%.
2) Length of 16 feet (4880 mm) is available only from 0.40 mm thickness onwards.
3) Weight per sheet for thickness 1.00 and 1.25 mm has not been indicated in the above table since these are not standard sizes. However, these sizes can be produced on demand.

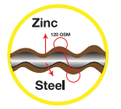
BRANDED ACCESSORIES: ROOF JUNCTION

TATA AGRICO

RIDGES

Usage of recommended accessories leads to enhanced life of Roofs and Walls. Poor and substandard quality of accessories may adversely affect the superior quality of cladding sheets leading to reduced life. Accessories and the cladding material should have similar life expectancies as that of the main structure and hence criteria for selecting the accessories such as Ridges, Gutters, Fasteners and Flashings must be based on the design life of the structure.

Available SKUs: 12", 18" and 24"



Lasts long due to 120 GSM Zinc coating

No leakage

Beautiful design

TATA STEEL

Trust of Tata

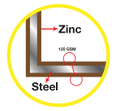
ROOF DRAINAGE & GUTTERS

Drainage of water from the roof is extremely important in order to achieve complete weather-proofing of the building. A well designed water collection system, through set of Gutters and Drain Pipes at eave-end, not only protects property and building but also helps in water harvesting.

Gutters made out of galvanized metal strips, are installed with a generous slope to avoid water accumulation.

Available SKUs: 18" and 24"

Prevents water accumulation



Lasts long due to 120 GSM Zinc coating

Beautiful design

TATA STEEL

Trust of Tata

ACCESSORIES:

FASTENERS

Researches executed on causes of steel building failures worldwide indicate that almost 80% of failures start from the fasteners. Since fasteners, used on cladding and structure together, constitute roughly 6-8% of the entire project cost, several builders have the tendency to neglect this vital aspect of their project.

Fasteners used on steel Roof and Wall Cladding must be of good quality and properly galvanized conforming to IS:730 standards. This will go a long way in providing a weather proof and long lasting roof. Different components of good quality fastener is depicted below in (Figure - 1).

There are various kind of hooks and screws available in the market depending upon the material and type of purlins on which sheets need to be fixed (Figure - 2). G.I. Hook Bolt should be used for fixing sheets to angle Iron Purlins. G.I. Crank bolt should be used for fixing sheets to channels or rectangular/square tubes purlins. G.I. Coach screw (square head) should be used for fixing sheets to wooden purlins only.

TYPICAL FASTENERS FOR CLADDING

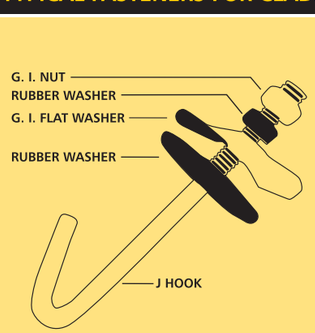


FIGURE - 1

TYPES OF HOOKS/SCREWS

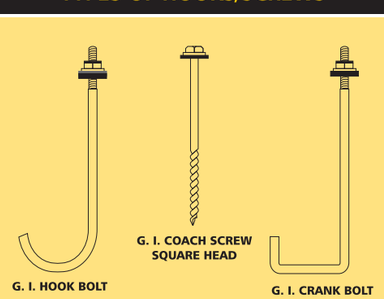


FIGURE - 2

The rubber washer should be 25 mm in diameter and 3 mm thick with 6 mm bore to suit 8 mm diameter bolts. This bond between rubber washer and bolt ensures water proof sealing.

The G.I. flat washer is 25 mm in diameter (if it is a round washer) and 1.60 mm thick with central hole to suit 8 mm diameter fixing bolt or screw.

The sheets are fastened to purlins (in case of Roof Cladding) or side girts (in case of Wall Cladding) by minimum 8 mm diameter hook bolts at a maximum pitch of 375 mm.

ACCESSORIES:

1. USAGE OF RUBBER WASHER

RUBBER WASHER

NEW	AFTER FEW YEARS
	

Usage of rubber washer enhances sheet life. The rubber washer does not absorb water or moisture and thus prevents the sheet from rusting.

BITUMEN WASHER

NEW	AFTER FEW YEARS
	

Usage of bitumen washer, commonly used with J hooks, retains water/moisture that leads to rusting that begin at the joints and spreads to the sheet reducing sheet life.

2. USAGE OF GALVANISED FASTENERS

GALVANISED J HOOK AND WASHTER

NEW	AFTER FEW YEARS
	

Usage of galvanised J hook, washer and nut enhances sheet life by preventing corrosion at the joints.

ALUMINIUM PAINTED J HOOK AND WASHER

NEW	AFTER FEW YEARS
	

Usage of aluminium painted J hook, washer and nut that looks similar to galvanised accessories lead to rusting. This begins at the joints and spreads to the entire sheet, reducing sheet life.

3. LIFE COMPARISON OF FASTENERS USED WITH RUBBER AND BITUMEN WASHERS

FASTENER WITH RUBBER WASHER

NEW	AFTER FEW YEARS
	

Usage of recommended fasteners enhance sheet life.

FASTENER WITH BITUMEN WASHER

NEW	AFTER FEW YEARS
	

Usage of poor quality fasteners lead to rusting that begin at the joints and spreads to the sheet reducing sheet life.

ACCESSORIES:

SELF-DRILLING SCREWS

Recent developments in the field of cladding fasteners have promoted usage of self-drilling screws designed to provide exceptional corrosion resistance and weather proofing. These screws confirm to international standards such as DIN, ASTM, AS and as the name implies, they are directly screwed through sheets onto the purlin with the help of a drill machine. Identification of these screws are depicted below. (Figure - 3)

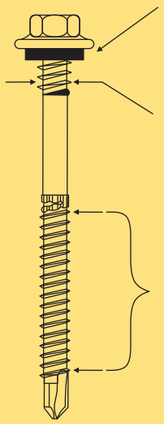


FIGURE - 3

EPDM WASHER (these washer are co-polymers, consisting of ethylene, propylene with proportion of diene and they offer extended life with best weather-proofing characteristics under extreme climatic condition)

SCREW GAUGE (gauge of a screw is determined by the basic of the thread outside diameter)

THREAD PITCH (thread pitch is the number of thread crests counted along a linear measurement of one inch)

IDENTIFICATION CODES of self-drilling screws are as follows:

12	-	14	x	25
Screw Gauge (Thread outside diameter)		Thread Pitch (threads per inch)		Overall length of the screw measured from under the head (mm)

FLASHINGS

Flashings are made from strips of galvanised metal in order to provide the essential weatherproofing at the edges of the cladding apart from making the finished job look neat. Flashings, depending upon their placement over the cladding, could be either longitudinal or transverse. Longitudinal Flashings run parallel to the valleys (Figure - 4) and are made to suit the profile of the sheets. During installation, one must turn down their edge towards the valley in order to achieve best weather protection. Transverse Flashings, also known as Ridges, run perpendicular to the valleys. In order to achieve maximum weather-proofing, the bent edge of the Ridge must sit onto the profile of the sheet (Figure - 5).

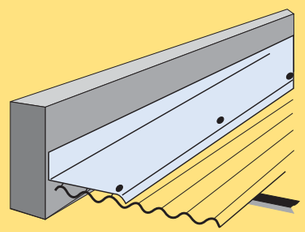


FIGURE - 4

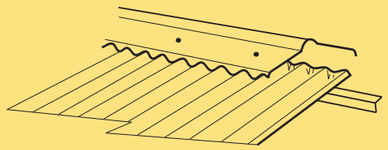


FIGURE - 5

ACCESSORIES:

TS TZ

TATA AGRICO

FEATURES

- High quality, self-drilling screws
- Hex flange head
- Self-drilling screw with EPDM-washer
- Better Corrosion Resistance
- Grey Ruspert (Teflon) coated (TS)
- Dichromate Coating (TZ)

Help line no: 1800 108 8282 | Visit at www.tataagrico.com | Follow us on

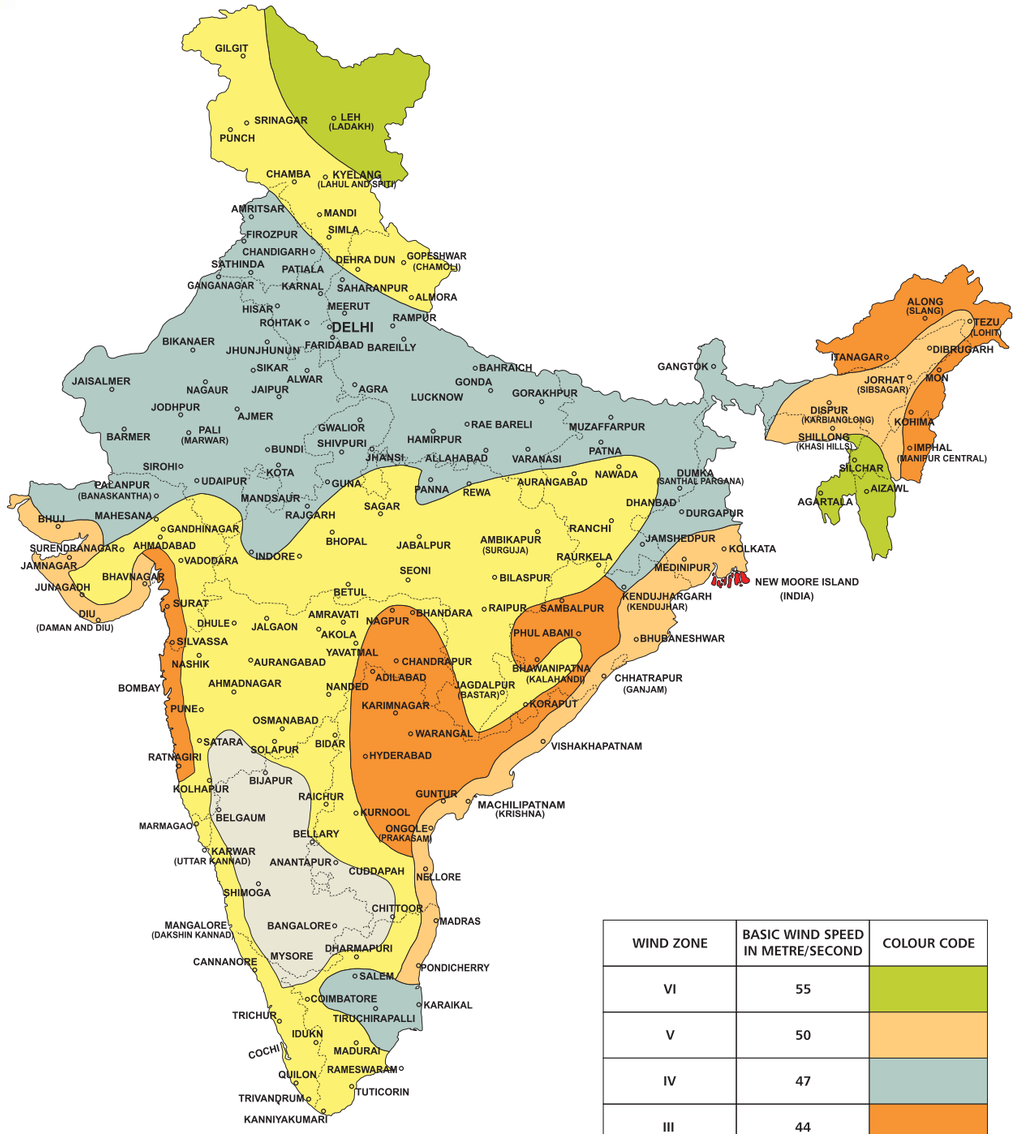
SKU CHART OF SELF DRILLING SCREW

TATA AGRICO

Sl No.	Item Description	SKU Code	Drilling Screw Nomenclature Gauge - TPI X Length (mm)	Type of Finish
GREY RUSPERT / TEFLON Coating Teck - 4 Tip (Outdoor / Roofing Application)				
1	SDS-SC-10-16X19MM	DSS001	10 -16 x 19	TS
2	SDS-SC-12-14X25MM	DSS002	12- 14 X 25	
3	SDS-SC-12-14X35MM	DSS003	12- 14 X 35	
4	SDS-SC-12-14X45MM	DSS004	12- 14 X 45	
5	SDS-SC-12-14X55MM	DSS005	12- 14 X 55	
6	SDS-SC-12-14X65MM	DSS006	12- 14 X 65	
7	SDS-SC-12-14X75MM	DSS007	12-14 x 75	
DICHROMATE COATING (Indoor Application)				
8	SDS-ZD-10-16X19MM	DSZ001	10 -16 x 19	TZ
9	SDS-ZD-12-14X25MM	DSZ002	12- 14 X 25	
10	SDS-ZD-12-14X35MM	DSZ003	12- 14 X 35	
11	SDS-ZD-12-14X45MM	DSZ004	12- 14 X 45	
12	SDS-ZD-12-14X55MM	DSZ005	12- 14 X 55	
13	SDS-ZD-12-14X65MM	DSZ006	12- 14 X 65	
14	SDS-ZD-12-14X75MM	DSZ007	12- 14 X 75	

Help line no: 1800 108 8282 | Visit at www.tataagrico.com | Follow us on

WIND FORCES



Source: United Nations Development Programme
Website: www.undp.org

WIND ZONE	BASIC WIND SPEED IN METRE/SECOND	COLOUR CODE
VI	55	
V	50	
IV	47	
III	44	
II	39	
I	33	

WIND FORCES

Speed of wind creates considerable forces on both top and bottom sides of the Roof Cladding and hence one must consider wind speed and its resultant forces while designing and installing a roof. Whilst the forces acting inward through the topside of the roofing sheet tends to push the Roof Cladding downwards, the outward forces acting through the bottom size of the roofing sheet tends to lift the Roof cladding from its frame. Outward forces could be generated by either negative wind pressures outside the building or positive wind pressure inside the building.

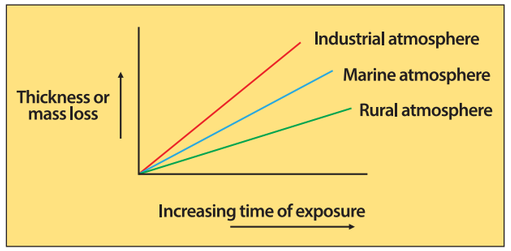
Outward forces acting on roofing sheets through bottom side are most common and these forces must be balanced by providing right spacing between the Purlins and by selection of right diameter, length and number of fasteners. In cyclonic areas, extra care must be taken in designing and installation of roofs by consulting architects or professional shed fabricators.

Recommended spacing between purlins for different wind zones*

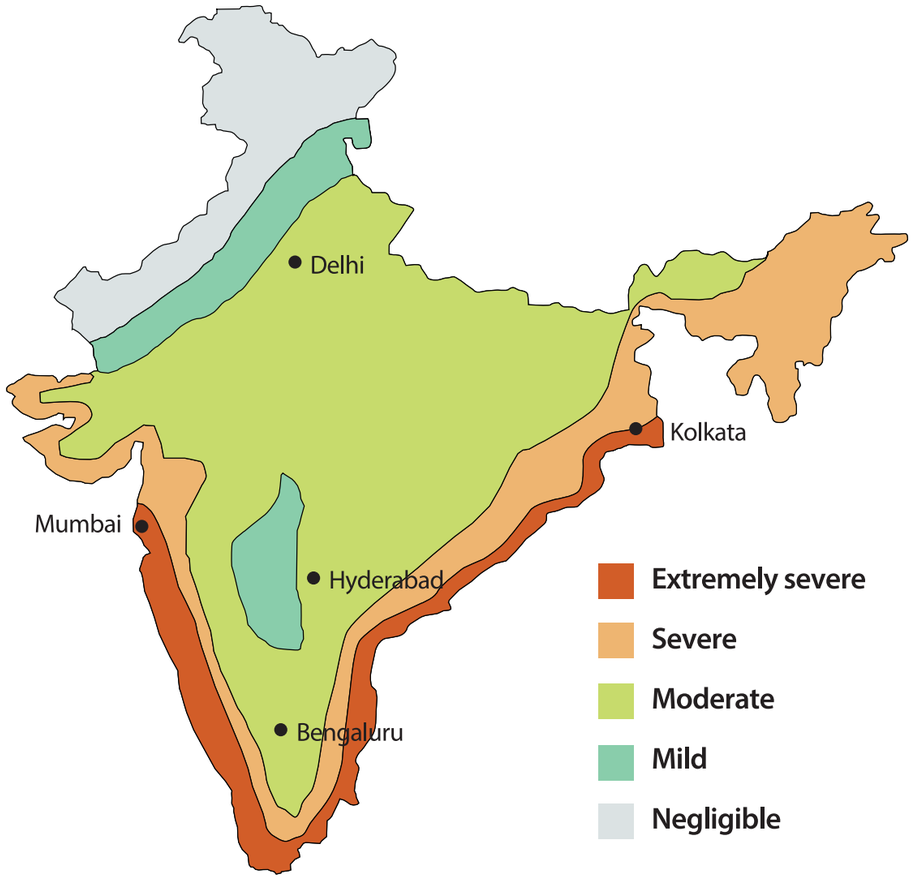
THICKNESS OF SHEETS (mm)	ROOF SLOPE	SPACINGS BETWEEN PURLINS (mm)					
		Wind Zone I	Wind Zone II	Wind Zone III	Wind Zone IV	Wind Zone V	Wind Zone VI
0.30	1 in 3	1090	1090	1090	1090	1090	1090
	1 in 4	1070	1070	1070	1070	1070	1070
0.35	1 in 3	1230	1230	1230	1230	1230	1160
	1 in 4	1220	1220	1220	1220	1220	1120
0.40	1 in 3	1320	1320	1320	1320	1290	1210
	1 in 4	1310	1310	1310	1310	1250	1170
0.45	1 in 3	1400	1400	1400	1400	1350	1260
	1 in 4	1380	1380	1380	1380	1300	1220
0.50	1 in 3	1480	1480	1480	1460	1200	1300
	1 in 4	1460	1460	1460	1410	1350	1270
0.55	1 in 3	1550	1550	1550	1500	1440	1350
	1 in 4	1530	1530	1530	1450	1400	1330
0.60	1 in 3	1620	1620	1620	1550	1480	1390
	1 in 4	1600	1600	1600	1500	1440	1350
0.63	1 in 3	1650	1650	1650	1580	1510	1420
	1 in 4	1640	1640	1600	1520	1460	1370
0.80	1 in 3	1860	1860	1800	1720	1650	1540
	1 in 4	1850	1850	1740	1660	1590	1490
1.00	1 in 3	2090	2090	1950	1860	1780	1660
	1 in 4	2000	2000	1880	1880	1720	1610
1.25	1 in 3	2230	2230	2120	1860	1930	1660
	1 in 4	2130	2130	2050	1950	1860	1740

*Calculations are based on basic principles of Structural Engineering in respect to Strength and Deflection.

CORROSION MAP OF INDIA



For a galvanized coating, the rate of corrosion is typically linear in most environments, i.e., twice the coating thickness translates to twice the 'life'. Of course, different environments are more or less corrosive than others, so that the 'life' of the coating varies considerably for different 'environment types'.

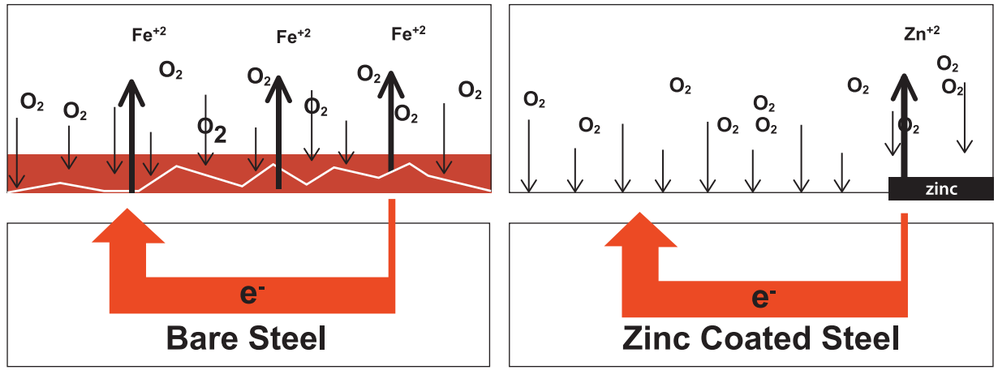


WHY ZINC COATING IS BEING DONE?

Some basic facts:

- Steel corrodes hence it needs protection
- Hot dip galvanized coating give longer life to steel
- As a rough estimate, the rate of corrosion of zinc coating is one twenty-fifth (1/25) of that of bare steel, irrespective of the coating thickness

Why Zinc coating?

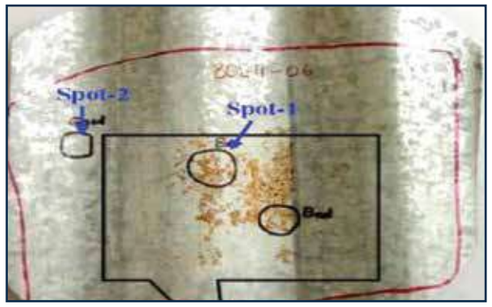


Because the electrochemical potential of zinc is lower than the potential of steel, only zinc dissolution occurs:

$Zn \rightarrow Zn^{2+} + 2e^-$

=>Steel is protected

RED RUSTING IN SPANGLED PRODUCT



Sulphur and its compound/gas from surrounding atmosphere, Zinc gets converted to white $ZnSO_4$; peel off as powder. Or the sulphur in oxide form react in presence of moisture and other chemicals to eat away the zinc completely.

Sodium Chloride/Chlorine & Ammonia

Chloride radical attacks the zinc to form white compounds of Zn & Cl, eating away the zinc layer, as in salt spray tests.

How to prevent red rust?

Corrective Action:

- Avoid direct contact of fumes with GC sheet
- Proper ventilation
- No contact with more Noble metals (like Copper, Nickel)

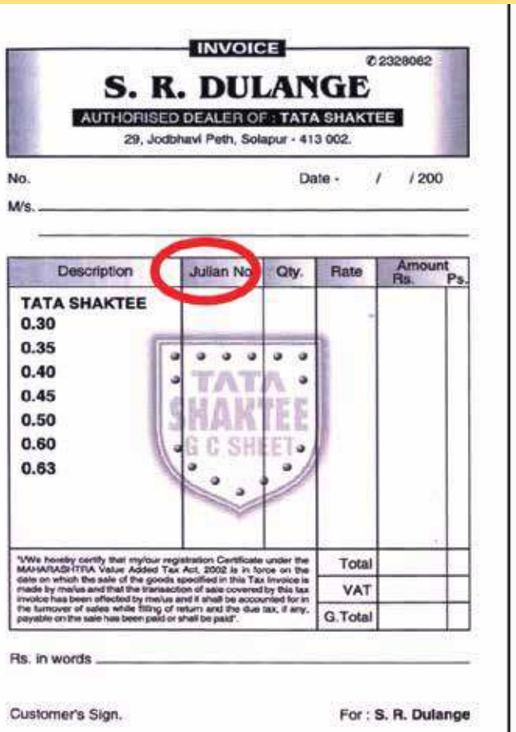
USAGE INFORMATION OF TATA SHAKTEE

TO AVOID	REACTIONS OF ZINC COATED STEEL UPON EXPOSURE	SOLUTION
Cement and Concrete	The reaction is with alkaline chemicals/moisture that slowly eat away the zinc coating. It may manifest in case of dry cement bags being stored on sheets laid flat. 	Use red code/epoxy paint prior to fixing
Industrial Gases from nearby sources like chimney	Depends on the nature of the effluent gases like NO_x or SO_x, which react preferentially with Zn, in presence of moisture.	Use of barrier coating or paint prolongs the life against such damage. (colour coated is recommended)
Embedded/attached earthing wire to the roof	Earthing wires, usually made from Cu shall cause galvanic corrosion of Zn coating reducing its service life. Corrosion shall progress even in steel after Zn is locally consumed	Can only be a preventive installation – no shorting between wire and Zn coated sheet
Rivera/bolts of dissimilar metals	Galvanic coupling between Zn and material of use in nuts/bolts may eat away Zn coating due to its high electrochemical activity. 	Avoid using bolts from other metals, use Zn coated bolts. If it can not be avoided, avoid physical contact between two metals (washers, sleeves etc) use powder coated or painted sheet than bare galvanised/chromated
Water/moisture	If subjected to humidity for a longer period of time with reduced Ventilation, zinc begins to show white rust (after depletion of secondary coating – chromate). Conversion of hydroxide to carbonate. This can also be seen if the surface of secondary coating gets scratched/damaged. This is sacrifice action of zinc which protects steel. In severe cases, red rust shall appear. Due to lack of ventilation, night time condensation onto the installed GC sheet is also common. 	Higher coating and/or protective painting (barrier protection) for applications such as ZC trays. If the stain has progressed to dark grey/black/reddish brown, removal is probably not possible. The most primitive form of white rust can be wiped. However, this is the location where the Zn coating shall deplete and could be the future location for earlier initiation of red rust.

USAGE INFORMATION OF TATA SHAKTEE

TO AVOID	REACTIONS OF ZINC COATED STEEL UPON EXPOSURE	SOLUTION
Excessive storage time (may lead to spangle darkening)	Processing time for GC sheets should be as quick as possible. Storage times > 3 months may lead to loss of lustre or spangle darkening phenomenon to take place. The degree of surface darkening may vary when these grades are stored for a longer period of time. This affects the appearance of the surface but does not adversely affect corrosion protection. High severity spangle darkening	Storage time as low as possible. Preferably avertical/inclined stacking in a well ventilated place. Avoid water pooling on sheet.
Others	Known installations of GC sheets where rusting took place prematurely • Stables/sheds for cows, horses, pigs • Onion storage sheds • Rusing at Logo – simultaneous red and white rust occurrence indicating highly aggressive environment • Other-factory sheds, kitchen with chulahs, chemical storage sheds, pesticides, tobacco and fertilizer sheds	Rusting at logo may get initiated in highly aggressive environments. Location is susceptible since solvent based logo after application of chromate. For applications like chemical storage sheds, tobacco sheds, fertiliser/pesticide sheds, onion sheds, tea manufacturing industry, the use of GC sheets is not recommended. Colour coated is recommended.

IMPORTANCE OF JULIAN NUMBER



INVOICE

© 2328062

S. R. DULANGE

AUTHORISED DEALER OF : TATA SHAKTEE

29, Jodbhavi Peth, Solapur - 413 002.

No. Date - / / 200

M/s.

Description	Julian No.	Qty.	Rate	Amount Rs.	Ps.
TATA SHAKTEE					
0.30					
0.35					
0.40					
0.45					
0.50					
0.60					
0.63					
			Total		
			VAT		
			G.Total		

"We hereby certify that my/our registration Certificate under the MAHARASHTRA Value Added Tax Act, 2002 is in force on the date on which the sale of the goods specified in this Tax Invoice is made by me/us and that the transaction of sale covered by this tax invoice has been effected by me/us and it shall be accounted for in the turnover of sales while filing of return and the due tax, if any, payable on the sale has been paid or shall be paid".

Rs. in words

Customer's Sign. For : S. R. Dulange

TATA SHAKTEE G C SHEET

प्रिय ग्राहक,

आपले अभिनंदन !

आता आपल्याकडे आहेत सर्वोत्तम दर्जाचे गॅल्वनाइज्ड पन्हाळी पत्रे – टाटा शक्ति पन्हाळी पत्रे. आपला टाटा शक्ति पन्हाळी पत्रे निवडल्यामुळे आपल्याला मिळेल आपल्याला हवे असलेले वास्तुसुख छप्पर. आम्ही खात्री देतो की आपली पन्हाळी पत्रे दीर्घकाळ टिकून आपल्याला संपूर्ण समाधान देतील. खाली दिलेली माहिती आपल्याला पत्र्यांची काळजी घेण्यास सहाय्य करेल, व त्याच बरोबर त्यांची कार्यक्षमता वाढवेल.

हाताळणी :

१. वैयक्तिक सुरक्षतेसाठी, पत्रे हाताळताना, आम्ही आपणास स्वच्छ, कोरडे हातमोजे (ग्लोव्हज) घालण्याचा सल्ला देतो.

२. जर पत्रे खरखरीत पृष्ठभागांवर किंवा एकमेकांवर घासू शेक नयेत, नाहीतर, त्यावर ओरखडे पडतील आणि पत्र्यावरचा जस्ता निघून जाईल.

साठवण :

१. जर पत्रे लगेच वापरण्यात येणार नसतील, तर, एका बंद व जमीनीपासून उंच ठिकाणी त्यांचा ढीग करून ठेवावा.

२. जर पत्र्यांचा ढीग ओला झाला तर, त्यांना लगेच वेगवेगळे करावेत, स्वच्छ वाफडाने किंवा भुस्त्याने पुसावेत आणि पूर्णपणे कोरडे होईपर्यंत उन्हात ठेवावेत.

३. छोट्या छोट्या वाहिनीच्या छिद्रांमुळे ढीग केलेल्या पत्र्याच्या पृष्ठभागांमध्ये ओलावा अडकलेला राहतो. अशिस आर्द्रता असलेल्या क्षेत्रांमध्ये वाऱ्याबरोबर ओलावा पत्र्यांमध्ये शिरतो. अडकलेल्या ओलाव्याचे वाष्पीकरण सहजरपणे होत नाही. जेणेकरून, पृष्ठभागावरचा थर खराब होऊ लागतो. ह्या प्रक्रियेला 'व्हाईट रस्टींग' म्हणुके पत्र्याचे आयुष्य कमी होते आणि स्वरूप खराब होते. अधिक आर्द्र क्षेत्रांमध्ये, आर्द्रतेचे प्रमाण कमी करण्याकरिता, साठवणीच्या ठिकाणी एक्झॉस्ट पंखे लावणे योग्य राहील.

पत्रे बसवताना घेण्यात येणारी काळजी :

१. पत्रा बसवताना त्याच्यावरची छिद्रे ड्रिलिंग करावीत. छिद्रे करण्यासाठी पंच वापरू नये, कारण त्याने व्यवस्थित छिद्र पडत नाही आणि पत्रा खराब होऊ शकतो.

२. टाटा शक्ति पन्हाळी पत्रे पर्लिनला लावण्यासाठी, उत्तम गुणांचे गॅल्वनाइज्ड बोल्ट, स्क्रू आणि वॉशर वापरावेत. कमी-जास्ती आणि गॅल्वनाइज्ड नसलेली अडकणाऱ्याची सामुग्री वापरल्यास, पत्र्याचे आयुष्य कमी होऊ शकते.

३. अडकाणाऱ्याच्या सामुग्रिबरोबर बिटुमेन बॉशरच्या ऐवजी रबर वॉशर्स वापरावेत. रबर वॉशर ओलावा किंवा पाणी शोषून घेत नाही आणि त्यामुळे पत्र्याचे सांधे गंजत नाहीत.

४. गॅल्वनाइज्ड पृष्ठभागावर चिन्ह करण्यासाठी सिसेपेंसिल वापरले टाळावे, कारण ते ओले असल्याचा त्यातील ग्राफाइटची भाषा एक विद्युत बल्य तयार करेल आणि यामुळे पृष्ठभाग खराब होऊन जाईल. यासाठी रंगीत पेंसिल किंवा फाईन पेल्टटिप्ड मार्कर वापरू शकता.

५. पन्हाळी पत्रे बसविण्यासाठी सर्वसेट इंजिनियरिंगचा वापर करावा आणि हे काम व्यवसायिक फॉब्रिकेटर आणि आर्किटेक्टद्वारे करून घ्यावे. बसवण्याची प्रक्रिया आणि उत्पादनाबद्दल अधिक माहितीसाठी जवळच्या टाटा शक्ति विक्रय कार्यालय किंवा अधिकृत टाटा शक्ति वितरकांकडून माहिती पुस्तिका मागून घ्यावी.

संभाळ :

छप्पराच्या गॅल्वनाइज्ड पत्र्यांचे आयुष्य वाढते जर त्यांचा सांभाळ व्यवस्थित केला तर. आपल्या छप्परांचे आयुष्य वाढविण्याकरिता खाली दिलेल्या काही छोट्या छोट्या गोष्टी लक्षात ठेवाव्यात.

१. छप्पर सदा नहि-व्यापून एकदा तरी धुवावे आणि स्वच्छ्ताठावरच्या क्षेत्रांमध्ये आणखी लौकर लौकर धुवावे कारण क्षेत्रांमधील ओलाव्यात जास्त प्रमाणात क्षार उपस्थित असते. परंतू कारखाने असलेल्या क्षेत्रांमध्येसुद्धा छप्पर नेहमी धुवावे, कारण रस्ट हवा असल्यामुळे सल्फर आणि नायट्रोजन ऑक्साइड आणि क्लोराइडचे क्षार जमा होतात.

२. पाने आणि गटारातील कचरा वारंवार आणि पद्धतीने वर्षातून एकदातरी करावे. शक्यतो पावसाळ्या अगोदर.

३. खात्री करून घ्या की छप्पराच्या चुकीच्या आकारामुळे, अधिक उतरणामुळे आणि बंद गटारांमुळे, छप्परावर पाणी साठत नाही.

४. छप्पराचे नियमित तपास करीत रहा आणि जास्त गंज चढण्याच्यापूर्वी छोट्या स्वरूपाची दुरुस्ती करा.

५. झाकलेल्या भिंती गळती आणि क्रॉकिटपासून मुक्त ठेवा जमीनी जवळ कचरा जमू देऊ नका.

- Capture Julian no. during Sales to Consumer
- Julian no. is directly related to mother coil no. and date of production
- Julian no./coil no. will help to trace the history of the material
- No complaint will be entertained if Julian no. is not available

RIGHT CONSTRUCTION PRACTICES FOR ROOFING

While one of the most important roles of roofing is to fight the weather, they also have significant effects on the aesthetic, cost and durability of a building. In Roof Cladding, factors such as rainfall, wind speed, height of building and walking weight on roofs (arising out of maintenance) have considerable effect on design of roof slope, supporting structures and spacing between Purlins (Figure - 6).

Design parameters for Wall Cladding is simple and straightforward compared to Roof Cladding. The main consideration in the design is spacing between the supports, known as 'Side Girt' (equivalent of purlins used in Roof Cladding). Wind speed and thickness of sheets play major role in arriving at the spacing between Side Girt.

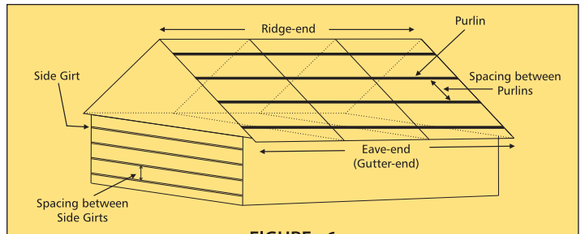
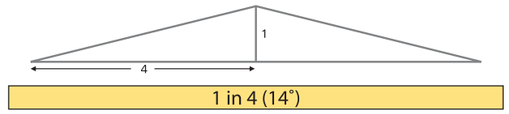


FIGURE - 6

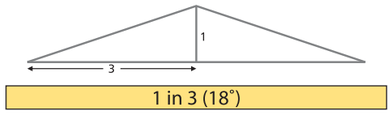
SLOPE

Slope is a major component of roof design. In absence of adequate roof slope, there is danger of water accumulation, which can lead to leakage and reduced sheet life. Most commonly used roof slopes in India are 1 in 4 (14D) and 1 in 3 (18D) (Figure 7 & 8). However, various other slopes can be used depending upon the intensity of rainfall and wind force. In case of sinusoidal profiles, it is recommended that one should not go below slope of 1 in 12 (5D). it is important to use sealants at the end lap of sheets in case roof slope is below 5D.



1 in 4 (14°)

FIGURE - 7



1 in 3 (18°)

Note: Roof slopes with 1 in 3 and higher are prevalent in locations with high rainfall/snowfall.

FIGURE - 8

OVERHANG

Overhang in Roof Cladding is important from the angle of complete weather-proofing of the building. While 'End Overhang' maintained at the 'Eave End' (Gutter end) of the roof facilitates proper drainage of water without drenching the inside of building from its front, the 'Side Overhang' makes sure the rain water does not enter the building from sides (Figure - 9). Overhangs are recommended below as per good engineering practice.

END OVERHANG (x)	SIDE OVERHANG (y)
300 mm	100 mm

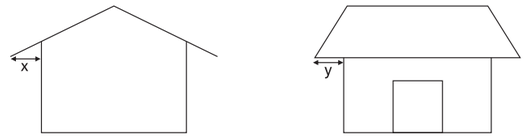


Figure - 9

JOINTS ON THE SHEETS

Joints on the roofing sheets, also known as 'Laps', are critical in fabrication of leakage proof roofs. Joints on the side of the roofing sheet (along sheet length) is known as 'Side Lap' (Figure - 10) while joint at the end of the sheet (along sheet width) is known as 'End Lap' (Figure - 11). Slope of the roof plays a major role in the deciding the area of laps.

SIDE LAP OF SHEETS

FOR ROOF CLADDING	FOR WALL CLADDING
1½ CORRUGATIONS	1 CORRUGATION

Note: In areas of heavy rainfall, the laps of sides should be suitably increased.

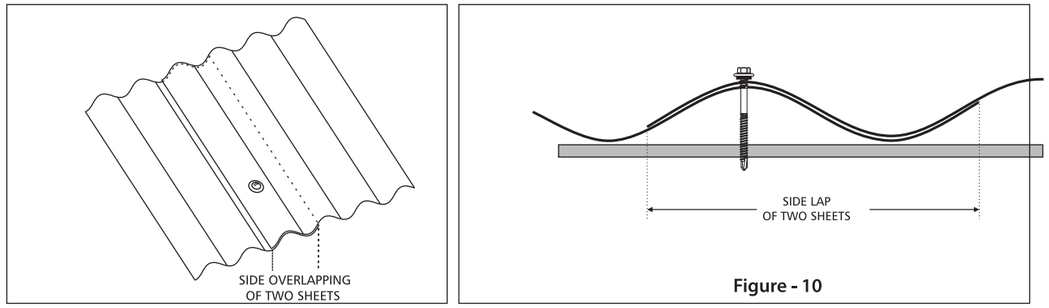


Figure - 10

END LAP OF SHEETS

ROOF SLOPE	FOR ROOF CLADDING	FOR WALL CLADDING
1 in 3 (18°)	150 mm	100 mm
1 in 4 (18°)	200 mm	100 mm

Note: For roof slopes lesser than 14° recommended end lap is 200 mm

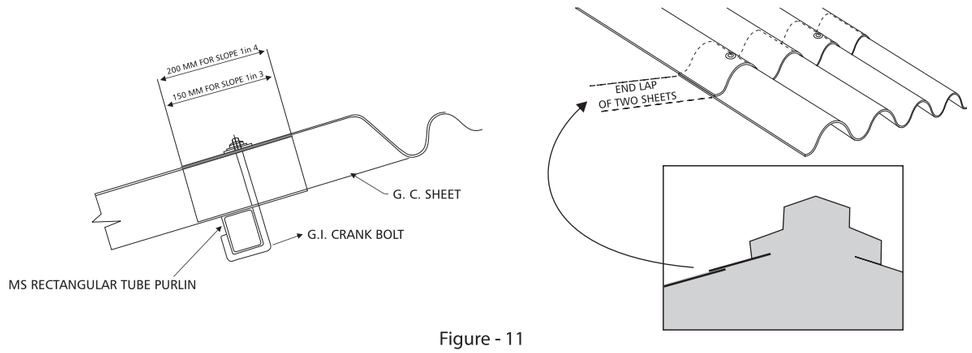


Figure - 11

RIGHT CONSTRUCTION
PRACTICES FOR ROOFING

NUMBER OF SHEETS REQUIRED FOR VARIOUS LENGTHS OF ROOFS

LENGTH OF ROOF		NUMBER OF SHEETS REQUIRED FOR VARIOUS LENGTH OF ROOFS			
(mm)	(feet)	800 mm	840 mm	910 mm	1220 mm
915	3	2	2	2	1
1525	5	3	3	2	2
3050	10	5	5	4	3
4575	15	7	7	6	5
6100	20	9	9	8	6
7625	25	12	11	10	7
9150	30	14	13	12	9
10675	35	16	15	14	10
12200	40	18	17	16	11
13725	45	20	19	18	13
15250	50	23	21	20	14
18300	60	27	26	23	17
21350	70	31	30	27	20
24400	80	36	34	31	22
27450	90	40	38	35	25
30500	100	45	42	39	28

CALCULATION OF NUMBER OF SHEETS REQUIRED FOR VARIOUS LENGTH AND WIDTH OF ROOFS:

L: Length of roof (in metre)
W: Width of roof (in metre)
L_S: Length of GC sheet used (in metre)
N_L: Number of sheets required for a given length and width of roof, (Figure - 12) will be = **$N_L X N_W$**
N_W:Number of sheets required along the width of roof

Total number of sheets required will be N_L x N_W (for a given length and width of roof, dimensions explained in Figure - 12)

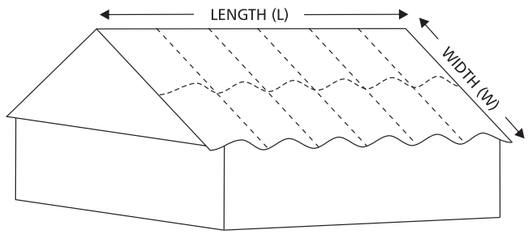


Figure - 12

WIDTH OF SHEET	NO. OF SHEETS ALONG LENGTH OF ROOF	NO. OF SHEETS ALONG WIDTH OF ROOF
1220 mm	$N_L = (L + 0.0875) / 1.1075$	$N_W = (W + 0.4) / L_S - 0.2$
910 mm	$N_L = (L + 0.0875) / 0.7975$	
840 mm	$N_L = (L + 0.0875) / 0.7275$	
800 mm	$N_L = (L + 0.0875) / 0.6875$	

Note : (1) End lap of 200 mm and Side lap of 112.5 mm considered to arrive at number of sheets across length of roof.
(2) Overhand of 300 mm at eave-end and 100 mm at ridge-end considered to arrive at number of sheets across the width of roof.

GUIDELINES FOR INSTALLATION

FOR ROOFING

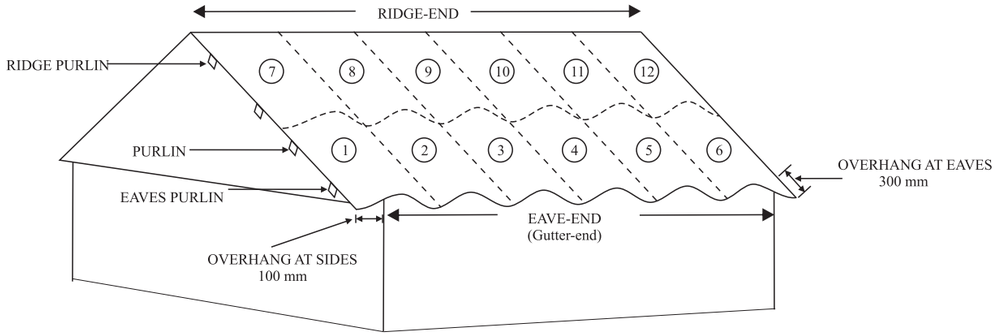


FIGURE - 13

Check flatness, slope and overhang of the frame on which the sheets are to be laid. Please remember that any correction in the frame required after laying the sheets will be difficult and at times impossible to rectify.

Before lifting the sheets on to the roof, check if they are right side up.

Place bundle of sheets over and near the firm supports and not at the mid-span of roof members.

Sheets are normally laid from left to right commencing at Eaves, explained in (Figure - 13) with sheets being numbered in order of fixing.

The first sheet is laid at the Eaves, (right angled 990 degrees) to the purlin with a side lap of one and a half corrugation.

The minimum free overhang at Eaves must not exceed 300 mm. care should be taken to ensure a minimum overhang of 100 mm at the side of the sheets. Ensure that the roofing sheets overhang minimum 500 mm into the Gutter at eave-end.

It is generally considered good practice to use fasteners along side-laps of sheets.

GUIDELINES FOR INSTALLATION

To be on safer side, do not fix fasteners less than 25 mm from the end of the sheets. Maximum pitch between two fasteners, across the width of the sheet, should be 375 mm.

While laying the first sheet at left of eave-end, please ensure that it is correctly located in relation to other parts of the building such as end and/or side-wall.

Check alignment of sheets at repeated intervals. It is important to keep the gutter-end and ridge-end of all sheets in a straight line. This can be achieved by keeping the sheets parallel with respect to the first sheet.

One can either fix each sheet completely before laying the next or can fix the sheet sufficiently to ensure it can't move, complete laying all sheets at one row and then return to place all intermediate fasteners.

In Roof Cladding, for maximum water-tightness, fastening screws through the crest of the sheets on to the purlin is highly recommended (Figure - 10, Page 24). Always drive screws perpendicular to the sheet and at the centre of the corrugation. Placing screws on valleys may be susceptible to leakage in Roof Cladding.

The sheets on the next row are fixed similarly making an end lap (joint along the length of the sheet – (Figure - 11, Page 24) of minimum 150 mm.

For Roof Cladding, allow a minimum end-lap of 200 mm for slopes of 5 to 14 degree, and 150 mm for slopes above 14 degree. For walls, allow minimum end lap of 100 mm.

For slopes below 1 in 4 it is recommended to use sealant at the end lap with a minimum 3 mm bead of natural cure silicon sealant along the centre line of the fastener hole.

Where four sheets meet at their corners, the total thickness becomes very thick. This gives a hump at the corners. To provide neat fit to the sheets at this junction any two corners of the diagonally opposite sheets have to be cut (mitred). Mitring means cutting of corners of the sheets to the measurement of side lap and end lap of the sheets.

Care should be taken to ensure that the sheets do not butt against each other. The gap between each mitred corner should be approximately 2 mm. (The two diagonally mitred comers being covered by the uncut comers of the covering sheets will provide for perfect sealing against weather). Mitring should be done by carpenter's saw and sheets should never be chipped.

GUIDELINES FOR INSTALLATION

At the ridge end of roofing, wind can push water up under the ridge, into the building in order to arrest this problem, valleys of the sheets are bent upward at the ridge-end of roofing (Figure-14). This process blocks the valleys at ridge-end thereby preventing water from entering the building through ridge-end. This process is highly useful in roofs with slopes below 1 in 2 (25°). In contrast, valleys at the eave-end of roofing sheet are bent down in order to achieve enhanced weatherproofness and smooth flow of water into the Gutters. Bending of sheets at valleys can be done with the help of multi-grip pliers or a sliding spanner.

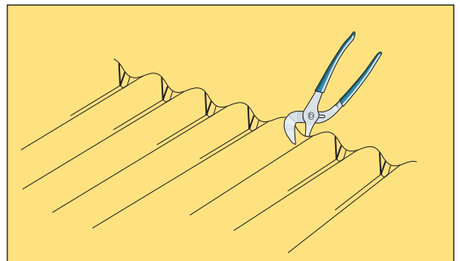


FIGURE - 14

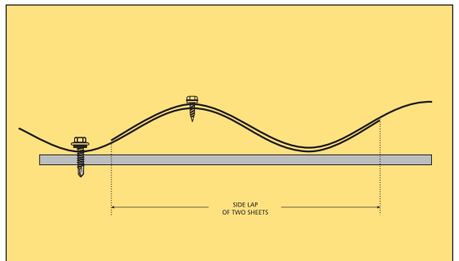


FIGURE - 15

FOR WALL CLADDING

In Wall Cladding fasteners are usually placed in the valley of the sheets since water penetration is not a problem in Wall Cladding. Fasteners at valleys are less noticeable and do not affect the aesthetic of the Steel Cladding. Also fasteners fixed on valleys of Wall Cladding minimize the risk of deformation of profile since the fastener rests flat against its support, i.e. Side Girt (Figure - 6)

However, when valley-fixed, the cladding needs a side-lap fastener in all laps, in order to hold the profiles of two sheets together (Figure - 15)

When the air in a building in contact with metal cladding is warner than the cladding, moisture in the air can condense on the inside of cladding. Condensation can lead to deterioration of building components, staining of ceiling & walls and even deterioration of items stocked inside the stocking area. The amount of condensation depends upon the amount of moisture present in the air and this varies with climatic conditions. Activities within a building such as washing and drying of cloths, cooking, showering etc. may also add substantially to the amount of moisture in the air. In the event of extreme moisture content inside the building, it is essential to either keep cladding away from moist atmosphere inside the building or vent substantial amount of air moisture to the outside of the building.

The minimize the risk of condensation on the inner-side of cladding a vapour barrier is often used to prevent contact of warm moist air with roofing. Reflective foil laminates are commonly used for this purpose. Such foils are also simple, inexpensive and very effective method to control heat. Additional heat insulation is often achieved by using bulk insulation blankets, which is a combination of reflective foil laminates, glass wool and wire mesh laid down on the frame before installing the coated sheets.

GENERAL CARE AND MAINTENANCE

Handling

For personal safety it is recommended to wear clean dry gloves while handling the sheets. Sliding of sheets over rough surfaces or over each other results in scratches and uprooting Zinc from the sheet surface.

Storage

Due to capillary action, moisture easily enters between the surfaces of stacked sheets. In areas of high humidity, wind takes them between the sheets. The trapped moisture between the sheets cannot evaporate easily leading to deterioration of the surface coating, a phenomenon known as White Rusting. This leads to reduced life of sheets and poor appearance. In areas of high humidity levels, it is advisable to have exhaust fans to reduce humidity level inside the sheet storage point. If the sheets are not required for immediate use, it should be stacked neatly and clear of the ground at covered space. It is advisable to protect them with waterproof covers. If stacked sheets become wet, separate it without delay, wipe it with a clean cloth or saw dust and stack it under sun till it dries thoroughly. Keep the stacked sheets as far as possible away from the non-compatible material as indicated in Table-1.

Marking, cutting and drilling during installation

Avoid usage of black pencils, i.e. lead pencils, to make a galvanised surface as the graphite content can create an electric cell when wet and this may cause deterioration of the finish of surface. One can use coloured pencils or a fine felt-tipped marker.

For cutting thin metal sheets

on site, it is recommended to use a hand or electric saw with a metal-cutting blade since it produces lesser damaging metal particles and burr on the sheets.

Holes on the sheets

should be made by drilling. Use of punch in making holes should be avoided as it may not produce a clean cut hole and may even damage the profile of the sheet.

GENERAL CARE AND MAINTENANCE

Maintenance: Besides roof design and the environment, maintenance also plays an important role on the life of a roof or wall. Maintenance includes the following:

- Preferably, washing should be done at least every six months and more frequently in coastal areas where moisture in atmosphere contains high level of salt. Washing of roof is also recommended in areas of high industrialization, which have higher content of oxides of sulphur, nitrogen and chloride salts along with humidity in the air.
- Regular inspection of roofs and walls for problems before they become major corrosion sites.
- Removal of foreign particles such as leaves and debris from gutters and flashings.
- Keep Wall Claddings free of soil, concrete and debris near the ground.

Contact with incompatible material: To enhance life of galvanized steel sheets, it is important to note its compatibility with other commonly used material in construction. Contact with some non-compatible material and even water or moisture flowing from such material can adversely affect the life of the sheets.

TABLE – 1: LIST OF NON-COMPATIBLE MATERIALS
■ Limestone (commonly used in colouring the cement walls)
■ Pesticides and fertilizers
■ Wet and dry concrete
■ Soils
■ Lead
■ Copper
■ Uncoated steel
■ Carbon (in pencils and some rubbers)
■ Chemically treated wood or plywood
■ Materials having excessive moisture content (Non-seasoned timber, bitumen sheets and washers)

Note : The list mentioned above is not exhaustive. In case of doubts on compatibility of other products being used with roofing sheets but not mentioned above, kindly seek advice from the manufacture of Galvanised roofing sheets.

WAMA

Introducing WAMA

Wama is Tata Steel's newest product offering in the retail and institutional segment catering to the walling and fencing needs of the consumer. The product is an outcome of the pioneering work done in terms of product design and quality. An optimum mix of mechanical properties and the delightful aesthetic appearance provided by trapezoidal profile and spangles form the hallmarks of Wama.

Wama is an 80GSM Zinc coated Galvanised Corrugated (Trapezoidal) sheet catering strictly to the non-roofing segment as per BIS specification with a marking "For Vertical Applications Only" on the product.

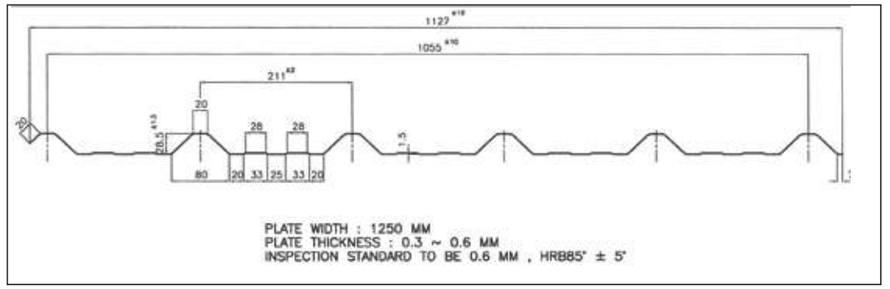
Key Features of Wama

Tata Kosh also endorses all the values which Tata Steel stands for. The products are carefully crafted with no compromise on quality and the promise to deliver only the best!

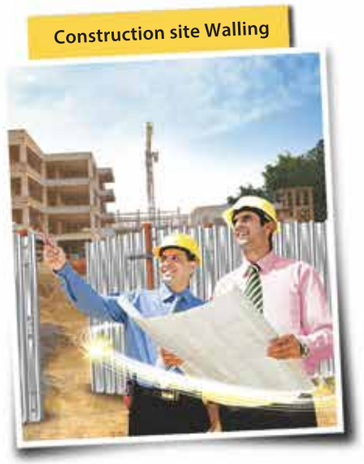
Some key features of Tata Kosh include –	
■ Promise of 80 GSM Uniform Zinc coating	■ Excellent surface finish
■ Trapezoidal profile for superior aesthetics	■ Optimum strength
■ Uniform and superior Zinc adhesion	■ Chromate passivation prevents white rust
■ Promise of exact sheet thickness	■ Excellent dimensional accuracy

Available Product sizes and characteristics

Dimensions: Thickness: 0.35 – 0.80 mm, Width: 1127 mm
Coating Type: Galvanized Regular-Spangled (Pure zinc with antimony)
Coating Mass: Galvanised 80GSM (total both sides)
Surface Condition: Normal spangle through bath, free of lead
Post Treatment: Chromating (Chrome 6)



WAMA APPLICATIONS



MARKETING & SALES OFFICES

EAST

Patna
Tata Steel Limited
401, Orchid Mall, Boring Road
Patna - 800 001
Tel: + 0612-2570094
Mob: +91-8092098243

Bhubaneswar
Tata Steel Limited
2-B, Fortune Towers,
Chandrashekharpur,
Bhubaneswar - 751 023
Phone: +91 0674 6511258

Kolkata
Tata Steel Limited
52 Jawaharlal Nehru Road,
Kolkata - 700 071
Phone: 91 33 2282 2015/2282/4299
Fax: 91 33 2282 1687

Jamshedpur
Tata Steel Limited
191, Burma Road, Burma Mines,
Jamshedpur - 831 001
Phone: 91 657 2426992

Guwahati
Tata Steel Limited
Guwahati Sales Office,
4th Floor, Subham Velocity,
Honuram Boro Path,
Opp. Wallford, G. S. Road,
Guwahati - 781 005
Phone: +91 0361 2130959

Raipur
Tata Steel Limited
Avanti Tower,
Rajdhani Vihar, Block No. B,
Flat No. 501, kachna Road (Saddu),
Near Bramha Kumari Ashram,
Raipur - 492 007
Phone: 09229112012

WEST

Mumbai
Tata Steel Limited
3rd Floor, One Forbes,
1, Dr. V B Gandhi Marg,
Fort Mumbai - 400 001
Phone: +91 022 6749 4620

Pune
Tata Steel Limited
Office No. 6 and 7, Second Floor, Wing B,
Great Eastern Plaza (Bajaj Allianz Building), Airport Road,
Pune - 411006
Phone: +91 20 66407580

Ahmedabad
Tata Steel Limited
2nd Floor, Premchand House,
Annexe, P.O. Box No. 4096,
Ashram Road, Old High Court Way,
Ahmedabad - 380 009
Phone: +91 79 6661 2600 2603

Nagpur
Tata Steel Limited
Museum Road, Civil Lines,
Nagpur - 440 001
Phone: +91 91 07126611812

Indore
Tata Steel Limited
3rd Floor, NRK Business Park, B-1,
Scheme No. 54, PU-4
A. B. Road, Near Mangal City,
Vijayanagar Square,
Indore - 452010, M.P.
Phone: +91 07316450691

Aurangabad
Tata Steel Limited
S-22, 2nd Floor, Alaknanda Complex,
Adalat Road,
Aurangabad - 431 005
Phone: +91 0240 6621477/6500137

NORTH

Delhi
Tata Steel Limited
Hindustan Times House, 15th Floor,
18-20 Kasturba Gandhi Marg,
New Delhi - 110001

Faridabad
Tata Steel Limited
2nd Floor, Business Centre,
33-B NIIT, Faridabad,
Haryana - 121 001
Phone: +91 0129 4098321

SOUTH

Chennai
Tata Steel Limited
8th Floor, Chettinad Sigapi Achi Building,
18/3-Rukmini Lakshmipathy Road, Egmore,
Chennai - 600008
Phone: +91 044 6696 0000/0037

Bengaluru
Tata Steel Limited
A Wing, 2nd Floor, Jubilee Building,
45 Museum Road, Bangalore 560 025
Office - 080 6695 0001/6695 0000

Coimbatore
Tata Steel Limited
No. 6, New Damunagar, Puliakulam,
Coimbatore - 641036
Phone: 09246200145

Secunderabad
Tata Steel Limited
6th Floor, Surya Towers,
104, Sardar Patel Road,
Secunderabad - 500 003
Phone: +91 040 67040300

Vijaywada
Tata Steel Limited
Kasturi Towers F1,
59-1-19A, Ramchandranagar Road No. 5,
Vijaywada - 520 008
Phone: +91 08676 253458 / 092464 92302